## REMARKS

Applicants confirm the January 31, 2007 telephonic interview with the Examiner by Applicants' representatives, Mr. Vadim Vapnyar and Mrs. Judy Naamat. The Applicants would like to thank the Examiner for conducting an interview on January 31, 2007. In response to Applicants' attempts to discuss substantive issues regarding the 35 USC 103 rejections, the Examiner directed Applicants to the final office action.

In view of the amendments above and the remarks to follow, reconsideration and allowance of this application are respectfully requested. Accordingly, early and favorable consideration of this application is respectfully requested.

Claims 1-16, 18-27, 29-44, and 46-57 are currently pending in the application, with Claims 1, 23, 29, 51, 53, and 57 being in independent form. Claims 1-16, 18-27, 29-44, and 46-57 are cancelled by the present amendment and new claims 58-100 are added, with claims 58, 80, 92, 94 and 98 in independent form. No new matter is believed to have been introduced by this amendment. Support for the amendments to the claims is provided below.

Claim 58 corresponds to Claim 1 of the November 6, 2006 amendment. The term "wherein the HFS provides a mapping from a disk sector to user data" was added to new Claim 58, and support is found on page 1, lines 9-13 of paragraph [0002] of the specification. The term "associating the at least one internal pointer of the HFS with the second root directory and the single parentless root directory of the HFS" was added to new Claim 58, and support is found in FIGS. 2A, 2B, 4, and 5 and in the description in the specification which corresponds to the named figures as well as Claim 13 of the November 6, 2006 amendment.

Claim 59 corresponds to Claim 2 of the November 6, 2006 amendment.

Claim 60 corresponds to Claim 4 of the November 6, 2006 amendment.

Claim 63 corresponds to Claim 1 of the November 6, 2006 amendment.

Claim 64 corresponds to Claim 5 of the November 6, 2006 amendment.

Support for Claim 65 is found in lines 7-9 of paragraph [0047], lines 1-5 of paragraph [0011], and lines 10-12 of paragraph [0039].

Support for Claim 66 is found in lines 2-5 of paragraph [0047].

Claim 67 corresponds to Claim 8 of the November 6, 2006 amendment.

Support for Claim 68 is found in FIGS. 4 and 5 and the corresponding description in paragraphs [0049]-[0062] where the exchange of the first and second sub-hierarchies is described and the physical locations of the first and second root directories remain unchanged during and after the exchange.

Claim 69 corresponds to Claim 11 of the November 6, 2006 amendment.

Claim 70 corresponds to Claim 14 of the November 6, 2006 amendment, and further more support for the added term, a "single storage medium", is found in lines 1-2 of paragraph [0013] and lines 1-5 of paragraph [0040].

Support for Claim 71 is found in lines 1-5 of paragraph [0028].

Support for Claim 72 is found in lines 1-2 of paragraph [0013] and lines 1-5 of paragraph [0040].

Claim 73 corresponds to Claim 15 of the November 6, 2006 amendment.

Claim 74 corresponds to Claim 19 of the November 6, 2006 amendment.

Support for Claim 75, which describes the hierarchical relationships between the first and second root directories is found in paragraphs [0041]-[0043] and is depicted graphically in FIGS. 2A and 2B. By definition, the parentless root is at a higher hierarchical level than other elements

of the hierarchical file system since the parentless root is the only parentless root, and all other elements that are part of the hierarchical file system branch from the parentless root.

Claim 76 corresponds to Claim 21 of the November 6, 2006 amendment.

Support for Claim 77 is found in FIG. 4 and the corresponding description in paragraphs [0049]-[0056].

Support for Claim 78 is found in FIGS. 4 and 5 and the corresponding description in paragraphs [0049]-[0062].

Support for Claim 79 is found in lines 3-5 of paragraph [0028].

Claim 80 corresponds to Claim 23 of the November 6, 2006 amendment. Support for the additional term, "associating the at least one internal pointer of the HFS with the second root directory and the single parentless root directory of the HFS" was added to new Claim 58, and support is found in FIGS. 2A, 2B, 4, and 5 and in the description in the specification which corresponds to the named figures as well as Claim 13 of the November 6, 2006 amendment.

Support for Claim 81 is described with respect to Claim 63 above.

Support for Claim 82 is described with respect to Claim 70 above.

Support for Claim 83 is described with respect to Claim 71 above.

Support for Claim 84 is described with respect to Claim 72 above.

Support for Claim 85 is described with respect to Claim 78 above.

Support for Claim 86 is described with respect to Claim 75 above.

Support for Claim 87 is described with respect to Claim 66 above.

Support for Claim 88 is described with respect to Claim 68 above.

Support for Claim 89 is described with respect to Claim 79 above.

Support for Claim 90 is described with respect to Claim 61 above.

Support for Claim 91 is described with respect to Claim 62 above.

Support for Claim 92 is described with respect to Claim 58 and 63 above.

Support for Claim 93 is described with respect to Claim 70 above.

Claim 94 corresponds to Claim 1 of the November 6, 2006 amendment. The term "wherein the HFS provides a mapping from a disk sector to user data" was added to new Claim 94, and support is found on page 1, lines 9-13 of paragraph [0002] of the specification. The term "manipulating at least one internal pointer of the HFS for accessing the second root directory using the first address" was added to new claim 58, and support is found in FIGS. 2A, 2B, 4, and 5 and in the description in the specification which corresponds to the named figures.

Claim 95 corresponds to Claim 2 of the November 6, 2006 amendment.

Claim 96 corresponds to Claim 3 of the November 6, 2006 amendment. Furthermore, support is found in FIGS. 2A, 2B, 4, and 5 and in the description in the specification which corresponds to the named figures.

Claim 97 corresponds to Claim 4 of the November 6, 2006 amendment.

Claim 98 corresponds to Claim 23 of the November 6, 2006 amendment. Support for the additional term, "a hierarchy established by the HFS of logical elements, wherein at least a portion of the logical elements are stored together on a single storage medium" is found in lines 1-2 of paragraph [0001] and lines 2-8 of paragraph [0002]. Support for the additional term, "the second directory branches below the first root directory" is found in paragraphs [0041]-[0043] and is depicted graphically in FIGS. 2A and 2B. By definition, the parentless root is at a higher hierarchical level than other elements of the hierarchical file system since the parentless root is the only parentless root, and all other elements that are part of the hierarchical file system branch from the parentless root. Support for the additional term, "manipulating at least one

internal pointer of the HFS for configuring the second root directory to be configured as the parentless root directory of the HFS" is described with respect to Claim 94 above.

Support for Claim 99 is found in FIGS. 2A and 2B and the corresponding description in paragraphs [0041]-[0043].

Support for Claim 100 is described with respect to Claim 1 of the November 6, 2006 amendment.

New independent Claim 58 recites:

> A method for replacing a first sub-hierarchy of at least two sub-hierarchies of a hierarchical filesystem (HFS) with a second sub-hierarchy of the at least two sub-hierarchies, the HFS having a single parentless root directory and being accessible by at least one processor, wherein the HFS provides a mapping between a disk sector and user data, the method comprising the steps of:
>> providing for the first sub-hierarchy to include a first root directory located in a first location of the HFS associated with the single parentless root directory of the HFS through at least one internal pointer, wherein the first sub-hierarchy includes a first plurality of files configured to branch from the first root directory;
>> providing for the second sub-hierarchy to include a second root directory located in a second location of the HFS, wherein the second sub-hierarchy includes a second plurality of files configured to branch from the second root directory; and
>> replacing the first sub-hierarchy with the second sub-hierarchy comprising the step of:
>>> associating the second root directory and the single parentless root directory of the HFS through the at least one internal pointer. *Emphasis added*

In the Final Office Action of December 19, 2006 and in the Advisory Action of July 20, 2006, the Examiner rejected Claims 1-14, 16-27, 29-42 and 44-57 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication Number 2004/0133790 to Hensley et al. ("Hensley et al.") in view of U.S. Patent Application Publication Number 2003/0065780 to

Maurer III et al. ("Maurer III et al."). Below, Applicants' distinguish the new claims from the cited references.

Hensley et al. describes a computer system including a primary operating system having primary bootstrap files configured to load and run the primary operating system, an emergency boot directory containing a backup copy of the primary operating system, and backup bootstrap files configured to load and run the emergency boot directory (*See* Hensley et al., Abstract). The emergency boot directory is formed during a setup phase by making a copy of the primary operating system's executable and configuration files from the computer hard drive into the emergency boot directory hierarchy (*See id.,* paragraph [0022], lines 1-4). Upon failure of the primary operating system the backup bootstrap files are used to boot the computer, including loading and running the backup operating system. In particular, a file system filter 12 redirects all file access requests, which would normally go to the primary directory, to the emergency boot directory. (*See id.,* paragraphs [0018]-[0020]).

Hensley et al. does not provide for "replacing the first sub-hierarchy with the second sub-hierarchy comprising the step of associating the second root directory and the single parentless root directory of the HFS through the at least one internal pointer" as recited in independent claim 58. The emergency boot directory never replaces the primary directory, instead both directories are present simultaneously, with the file system filter 12 allowing for access to only one of the primary or the emergency directories, depending whether the file system is enabled or disabled. If the file system filter 12 is disabled "the request is sent to the underlying file system driver 14 (block 36) for normal processing." (*Id.,* paragraph [0020]). If the file system filter 12 is enabled, "the intercepted request is examined to determine if it is a file or data access request

referencing a file or directory in the emergency boot directory hierarchy." (*Id.*, paragraph [0020]).

Hensley et al. specifically teaches away from relocation and/or replacing primary directory with the emergency boot directory, stating that "no existing files must be modified (with the exception of minor modifications to the primary operating system files, to load the file system filter driver 12 upon booting) or relocated." (*Id.*, paragraph [0029]).

Further, Hensley et al. does not disclose "associating the second root directory and the single parentless root directory of the HFS through the at least one internal pointer" as recited in independent claim 58. In previous Office Actions, the Examiner referenced paragraph [0058] of Hensley et al., to demonstrate that relocating or replacing of the directories was accomplished by modifying the BOOT.INI "to replace any references to the primary operating system directory structure with references to the new emergency boot directory (block 66)." (*Id.*, paragraph [0025]). Changing references in the emergency backup bootstrap files to reference the emergency boot directory instead of the primary operating system directory structure is not equivalent to manipulating "at least one internal pointer of the HFS." The BOOT.INI file is simply a plain text file that is kept in the system root by Windows® operating systems. Changing the references clearly refers to editing the actual call lines within the BOOT.INI file to properly refer to the hidden emergency boot directory. This process does not involve internal pointers of the HFS, which is a computing task of a lower level (e.g., closer to machine level) than the high-level editing of a text file to reference a hidden directory.

With respect to Maurer III et al., a data storage system is described including a storage array having logical volumes (e.g., hard drives) or units (LUNs) that can be accessed by one or more clients via a switch (*See* Maurer III et al., paragraph [0112]). Each respective LUN 1204a-

1204n is provided on a discrete and separate physical device. Originally a first LUN 1204a is accessed by the client. LUN 1204a is backed up and restored by first creating a copy of the first LUN 1204a on a second LUN 1204b. LUNs 1204a and 1204b are mirror synchronized so that writes to the first LUN 1204a are also updated on the second LUN 1204b. At a given time the mirror is split so that writes to the first LUN 1204a are no longer made to the copy on the second LUN 1204b. The second LUN 1204b is a point-in-time copy of the first LUN 1204a. The first logical unit 1204a may no longer be available or reliable, such as due to some type of failure, in which case the client accesses LUN 1204b instead of LUN 1204a. A copy of the second LUN 1204b is created on LUN 1204a (which may have been replaced with a new disk). The client accesses LUN 1204a, so that LUN 1204a is restored.

Maurer III et al. specifically states that "the logical unit can contain data in one of the following formats: JBOD (just a bunch of disks), RAID 0 or RAID 1 or RAID 0+1." (*See id.,* paragraph [0121]). JBOD and various RAID levels are conventional methods for combining multiple physical disk drives into a single virtual disk. Thus, Maurer III et al. is directed to mirroring and accessing of data across multiple hard drives and does not relate to hierarchal file systems.

Maurer III et al. does not cure the deficiencies of Hensley et al. since Maurer III et al. also fails to teach, disclose or suggest "replacing the first sub-hierarchy with the second sub-hierarchy comprising the step of associating the second root directory and the single parentless root directory of the HFS through the at least one internal pointer" as recited in independent claim 58. As discussed above, Maurer III et al. is not even directed to hierarchal file systems, the LUNs 1204a and 1204b are not members of a hierarchal file system and hence do not correspond to the first and second sub-hierarchies as recited in claim 58. In contrast, the LUNs 1204a and

1204b are associated with physical disks which are mounted and unmounted using physical mount host connections as described in paragraphs [0132]-[0134]. On page 3, lines 9-10 of the Final Office Action of December 19, 2006, the Examiner equates the mounting process on Maurer III et al. with associating logical pointers to files and folders. The mounting process involves assignment of a LUN to a mount host connection and use of offset to access the LUN. Since a mount host connection is a physical type of connection, Applicants respectfully submit that the system of Maurer III et al. teaches only physical access of the appropriate LUN. It follows that Maurer III et al. also fails to disclose "replacing the first sub-hierarchy with the second sub-hierarchy comprising the step of associating the second root directory and the single parentless root directory of the HFS through the at least one internal pointer" as recited in independent claim 58.

With reference to the combination of Hensley et al. and Maurer III et al., there is no suggestion how the features of the computer systems of Hensley et al. and Maurer III et al. could be combined to recite "replacing the first sub-hierarchy with the second sub-hierarchy comprising the step of associating the second root directory and the single parentless root directory of the HFS through the at least one internal pointer." Maurer III et al. is directed to computer system components, namely hardware, which are different in type from the elements, namely software, of the Hensley et al. computer system. The Examiner has not specified structurally, functionally or logically how the elements of the Maurer III et al. computer system would be combined with the elements of the Hensley et al. computer system, or what their relationships would be. More specifically, it is not apparent how the hardware implementation used by Maurer III et al. in which disks are mounted and unmounted and accessed by a switch can be combined with Hensley et al. in which the primary emergency boot directories are booted

using alternate bootstrap files. Nor is it clear how such a combination would arrive at Applicants' claimed hierarchal file system including "replacing the first sub-hierarchy with the second sub-hierarchy comprising the step of associating the second root directory and the single parentless root directory of the HFS through the at least one internal pointer," as recited in applicants' independent claim 58.

Accordingly, for at least the reasons stated above, independent claim 58 and claims 59-79 which depend therefrom are patentable over Hensley et al. and Maurer III et al., taken alone or in combination. Since independent claims 80 and 92 include similar recitations as claim 1, namely, independent claim 80 recites "a set of programmable instructions executable on the at least one processor for replacing the first sub-hierarchy with the second sub-hierarchy comprising the step of: associating the second root directory and the single parentless root directory of the HFS through the at least one internal pointer." Independent claim 92 similarly recites "means for replacing the first sub-hierarchy with the second sub-hierarchy configured to associate the second root directory and the single parentless root directory of the HFS through the at least one internal pointer." For at least the reasons stated above with respect to independent claim 58, it is respectfully submitted that independent claims 80 and 92 and claims 81-91 and 93 which respectively depend therefrom are also are patentable over Hensley et al. and Maurer III et al., taken alone or in combination.

Independent claims 94 and 98 also recite a similar limitation as claim 58, namely, "manipulating at least one internal pointer of the HFS for accessing the second root directory using the first address" and "manipulating at least one internal pointer of the HFS for the second root directory to be configured as the parentless root directory of the HFS" respectively. Independent claim 98 also specifically recites "wherein the second root directory branches below

from the first root directory." Neither Hensley et al. and Maurer III et al., taken alone or in combination, disclose a hierarchal relationship between the directories of Hensley et al. and the LUNs of Maurer III et al. For at least the reasons stated above it is respectfully submitted that independent claims 94 and 98 and claims 95-97 and 99 and 100 which respectively depend therefrom are also are patentable over Hensley et al. and Maurer III et al., taken alone or in combination.

## CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that none of the references of record, considered individually or in combination, in whole or in part, disclose or suggest the present invention as claimed. Therefore, all Claims now pending in this application, namely Claims 58-93, are now in condition for allowance. Accordingly, early and favorable consideration of this application is respectfully requested. Should the Examiner believe that a telephone or personal interview may facilitate resolution of any remaining matters, he is respectfully requested to contact Applicants' undersigned agent at the telephone number indicated below.

Respectfully Submitted,

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